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American Public Health Association

ANTI-TYPHOID VACCINATION IN THE AMERICAN ARMY.*

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Typhoid fever is one of the diseases which leaves behind it a very considerable protection against subsequent infection. Second attacks occur just as they do after smallpox, but they are not very common. Dreschfeld, quoted by Osler, says, "Of 2,000 cases of enteric fever at the Hamburg General Hospital, only fourteen were affected twice and only one three times." In view of this high grade of immunity following natural typhoid, it is not surprising to find that studies looking to the production of artificial immunity were undertaken early in the history of modern bacteriology. Pasteur's success in immunizing animals aganist anthrax led Fraenkel and Simons, as early as 1886, to investigate the question of producing artificially an immunity against typhoid. Using rabbits in their experiments, they found that small sub-lethal doses conferred on these animals protection against subsequent fatal doses. In the same

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year Beumer and Peiper succeeded in immunizing mice. At that time they suggested the use of sterilized cultures, in place of living ones, and considered the possibility of its use on human beings.

Nothing of any great value was accomplished in these early days, since our knowledge of toxins, antitoxins, and immunity in general was so fragmentary. It was not until after Pfeiffer had shown that the toxins of cholera and typhoid bacilli were not soluble, as is diphtheria toxin, but were integral parts of the bacillary substance, that real progress in immunization against these two diseases became possible. Up to the time when Pfeiffer published his classical experiments, there was no method of examining the blood serum of man or animals adequate for the detection of protective substances in the blood.

It was not until 1896 that Pfeiffer and Kolle, in Germany, and Sir A. E. Wright, in England, reported successful attempts to protect human beings. The paper of Pfeiffer and Kolle, to be sure, describes only two cases, but it is so comprehensive that it covers the field completely. They showed not only that agglutinins were produced in the blood in response to the inoculation of dead bacteria, but that the bacteriolytic power of the blood was also raised in the same way as it is during an attack of typhoid fever. Haffkine, working in India, had cleared the ground by showing that it was possible to protect human beings against cholera by inoculating them with living cholera cultures. Sir A. E. Wright announced his first inoculations of men with typhoid bacilli in 1896, but it was not until 1897 that he published a paper bearing directly on the subject. At this time he reported the results of anti-typhoid inoculations in 18 persons. Although Pfeiffer and Kolle and Haffkine have contributed a great deal to our knowledge of the subject, it is nevertheless true that our progress in this field is due largely to the energy and persistence of Sir A. E. Wright. In 1898 he inoculated about 4,000 men of the British Indian Army, and secured very good results. Soon after this came the Boer War, and Wright furnished vaccine for as many volunteers as could be obtained—about 100,000.

Even this very extensive trial of the method did not give convincing results, and many of the profession remained sceptical of the value of the method. The reports from different military organizations in South Africa were widely at variance with one another, as at times the inoculations seemed to give good protection, and at other times no good effect was noted. The situation was difficult to explain, if one accepted the statistics as true, and no satisfactory explanation has been forthcoming until recently. Sir William B. Leishman, of the Royal Army Medical

Corps, was associated with Wright at this time, and the actual preparation of almost all of the vaccine used in South Africa fell to him. He now believes that "the methods then employed in the preparation of the vaccine may have resulted in considerable variations in its vaccinating efficiency. Some men may have received but slight and transient immunity, while others were protected in as high a degree as the system was capable of." At the end of the Boer War, in 1902, the general lack of agreement as to the value of anti-typhoid vaccination led to a suspension of its use in the army. Several commissions have since been appointed to study the problem; up to the present time, three reports have been made, and all of them have been favorable. The method has been reintroduced into the English army, and during the last few years the anti-typhoid campaign has been actively pushed.

In order to understand the variation in the amount of protection obtained at that time, it is necessary to consider for a moment the manner in which the vaccine is prepared. Wright's original method consisted in growing the bacillus in broth for three weeks and then sterilizing the cultures by heating them to 60° C. in a water bath for one hour. The time of incubation was afterwards shortened to two days. The system worked well so long as only small quantities were needed. When larger batches were to be made, Wright devised an ingenious paraffine thermometer, which consisted of a bulb and tapering stem, and which was placed inside the culture flask; this latter was filled with paraffine with a melting point of 60° C. As soon as the culture reached that temperature, the paraffine melted, and the bulb, which up to that time had acted as a float, filled with the culture and sank to the bottom of the flask. The contrivance should have worked according to the plan, but as a matter of fact it often failed, and it is now believed that much of the vaccine was overheated. Subsequent experiments by Leishman and his co-workers have shown that a vaccine may be greatly weakened by too much heat, and, consequently, they never subject their vaccine at the present time to more than 53° C. for one hour.

The fact that some of the vaccine used by both the English and the Germans may have been overheated, and thus weakened, gives the best explanation of the occasional unsatisfactory results which were obtained in the early days of this work. We now have no trouble in producing uniformly good and potent vaccine.

Following the South African War, the next extensive use of anti-typhoid vaccine was in the German Colonial Army in South West Africa during the Herero campaign from 1904 to 1907. In 1904, the number of cases of typhoid among the troops was 226, in spite of the fact that all the

usual hygienic measures which it was possible to carry out were brought to bear, and in spite of the fact that the medical officers were given an unusual amount of authority and means to fight the disease. The practical failure of the usual means of control caused the military authorities to submit the entire question to Professor R. Koch, who recommended the prophylactic use of anti-typhoid vaccine. It was largely due to this measure that the number of cases fell from 226 in 1904, to 43 in 1907. The troops numbered 16,496, and of these 7,287 were vaccinated. The vaccine used was prepared according to the method of Pfeiffer and Kolle, and as compared with that used by the English and by us, the dosage is rather large, and the resulting reactions are much more severe and troublesome. The Germans had 1277 cases of typhoid among the troops; and a study of the distribution of the cases shows clearly the undeniable advantages of anti-typhoid vaccination, even though the German results are not as good as have since been obtained in India and in our own service. The percentage of cases among the uninoculated was 9.84, while among the vaccinated it was only 5.09, or about half as high. This, however, does not tell the whole story, since when the fever did occur among the vaccinated, it was distinctly milder, and complications were only half as frequent.

The results obtained by the English in India up to June, 1908, have been published, and they show that among 12,083 men, 5,473 had been vaccinated and 6,610 had not. Among the non-inoculated, the case incidence was 28.3 per thousand, and among the vaccinated it was 3.8. There were 21 cases, with 2 deaths, among the vaccinated, and 187 cases, with 26 deaths, among the non-inoculated. Of the 21 cases among the vaccinated, all but four had received but one dose of the vaccine. It is well known that one dose does not give a very high degree of protection. Four of the cases had received 2 doses, and in them the disease was very mild and ended in recovery. Complete reports of the English results in India have not yet been published, but Leishman has stated this year that the ratio of attacks in the inoculated to those in the non-inoculated is less than one to five, and that they have statistical evidence of a distinctly higher and more uniform grade of immunity than was formerly the case.

In our own army the vaccination against typhoid fever was begun in March, 1909, and up to the present time (August 1, 1910) we have records of the vaccinations of 11,771 persons. The total number of doses administered is 31,556. It has been our practice to give 3 doses at 10 day intervals to as many volunteers as possible. We find that 75% have received the full course of 3 doses; 21% have received 2 doses, and only 4% have

failed to receive more than one dose. The failure to receive the second dose has sometimes been due to refusal, but just as often to change of station, discharge, desertion, and like causes. The first dose is 500,000,000 bacteria, the second and third, 1,000,000,000 each. The vaccine is prepared by growing a selected non-virulent strain of the bacillus on agar in flasks for 18 hours and then emulsifying the growth in salt solution. The vaccine is standardized by counting the bacilli, and is sterilized at 56° C. for one hour; ¼% of tricresol is added as a preservative. In the use of this method no untoward results whatever have been reported.

There is a widespread idea that the reaction immediately following each dose of the vaccine is rather severe and unpleasant, but such has not been our experience. A careful record has been kept of every dose given, the results of which are shown in the following table:

REACTION.

	Absent	Mild	Moderate	Severe
First dose.....	62.7%	32.0%	4.5%	0.7%
Second dose.....	68.6%	25.8%	5.0%	0.6%
Third dose.....	79.0%	16.7%	4.1%	0.2%

The number of moderate (4.5) and severe reactions (0.5) together is only 5%, and thus 95% of the men had little or no fever or discomfort, aside from the local reaction. This consists of a somewhat red and tender area at the point of inoculation which is rarely troublesome and usually disappears in from 48 to 72 hours.

When the occasional severe reaction does occur, it need give rise to no alarm, since the symptoms begin to subside in a few hours, and, as a rule, completely disappear in two days. The concomitants of a severe reaction may include fever, chills, herpes, nausea, vomiting, diarrhea, and albuminuria. Hysterical attacks have also been occasionally reported. The symptoms of a mild reaction may best be described by saying that the individual feels as if he were coming down with a cold, but his quick recovery indicates that his indisposition was merely the effect of the vaccine.

It is too early to judge of the full effect this measure may have on the health of the Army. I shall merely state that about one-seventh of the force has been vaccinated, and that among these men we have had 3 cases of typhoid, while, during the same length of time, we have had 306 cases among the unvaccinated. This gives a ratio of almost 16 to 1 in favor of those vaccinated. The 3 cases were all mild and ended in recovery.

The first case was probably infected immediately before or after receiving the first dose, and was admitted to the hospital soon after the second; the diagnosis was confirmed by isolation of the bacilli from the stools. The other two cases were so mild that, in the absence of blood cultures, there remains some doubt as to the correctness of the diagnosis.

We do not yet know how long the immunity will last. The agglutinins and other antibodies present in the blood serum diminish greatly or disappear after about a year. This does not help us in estimating the duration of the protection, since the antibodies exist in smaller quantities and disappear sooner after typhoid than after vaccination, yet the naturally acquired immunity is, as a rule, present for life. The experience of the English would seem to show that the men were still protected after the lapse of three years; and we do not know how much longer the immunity may last. If it does last for three years or more, as seems probable, that is sufficient for our purpose, as it is improbable that any modern war will last longer than that.

It has now been sufficiently demonstrated that in anti-typhoid vaccination we have a simple, harmless, and effective means of prophylaxis, which can be used as a supplement to all the usual sanitary measures. It is not a measure which will supplant any of the usual measures, but it will prove a valuable adjunct to them, and will be of particular value where it is impossible to carry out the regular hygienic precautions.

In civil life, as well as in the Army, there are many situations where the vaccine may now be used. We have passed through the experimental stage, and should not allow our practice to lag behind our knowledge. All persons whose vocations expose them particularly to typhoid should certainly be vaccinated. Richardson and Spooner have shown the advantage of the measure when used for the protection of physicians, nurses, and hospital attendants. Laboratory workers should also be protected. In isolated communities, in insane asylums, in gangs of railroad employees, in industrial and mining villages, the vaccine may be used to advantage. One of the most hopeful fields for its use is among travelers, and among children and young people before they go into the country or to the seaside for the summer. Children are weighed to determine the dose and given a quantity proportional to their body weight, using a hundred and fifty pound man as a standard. We have never, as yet, had any severe reactions in children, in fact, they do not seem to be inconvenienced by it to any extent.

This vaccination will undoubtedly find its greatest usefulness when applied to an army in the field. It is unnecessary to mention the terrific ravages made by this disease in military campaigns and in camps of mobil-

ization. The conditions of camp life are such that the fever spreads so rapidly by contact that we practically have to deal with a contagious disease. In the Spanish War there were 20,738 cases, with 1,580 deaths, among 107,973 men. This is equivalent to 19.26%, or nearly one case to every five men. In the Boer War the English had 31,000 cases, with 5,877 deaths. In the Franco-Prussian War the Germans had 73,396 cases, with 8,789 deaths. In fact, 60% of their total mortality was due to this disease.

It is then a matter of almost common knowledge that, in the past, typhoid has decimated the ranks in every campaign, and we cannot afford to neglect any measure which will help us to control the disease.

After our experience of the last year and a half, during which time we have prepared large quantities of vaccine at the Army Medical School, and administered over 31,000 doses of it, we feel that we have a measure which is safe, practicable to carry out, and satisfactory. We believe it will help materially to reduce our morbidity and mortality and place the Army on a more effective and efficient basis.

MAYORS AND MUNICIPAL HEALTH.*

By JOHN A. KINGSBURY,
Assistant Secretary of the New York Charities Aid Association.

Is there a health officer who has not been repeatedly discouraged almost to the point of giving up his struggle for better health conditions in his city or state, because of his inability to secure the necessary financial support for his work? Is there a health officer who has not vainly implored and importuned the mayor and other officials who control appropriations, for the share of the city's funds to which the health department is justly entitled? Assuming that our health officers are working courageously and conscientiously in behalf of the public health, the answer to these questions is found in the bulletin recently issued by the United States Census Bureau on "Statistics for Cities for 1907." This bulletin contains the following enlightening figures for the 47 cities in the United States with a population between 50,000 and 100,000:

	Number Employed	Amt. Appropriation
Firemen	4,899	$4,632,497
Police	4,822	4,262,322
Health Inspectors	247	842,842

There can be no more eloquent evidence than is borne by these figures of the failure of those who control finances in cities to appreciate the relative importance of the protection of property as against the protection of health. We rejoice in the liberal appropriations for police protection; we rejoice in the generous support given for the protection against fire; but we deeply deplore the lamentable lack of funds for the protection of public health. We need not give ourselves much concern, however, about the support of the police department, or of the fire department; merchants and manufacturers who have their stores and shops to protect from burglaries will see to the former, and the latter will be taken care of by the fire insurance companies. But who will look after the health of the city, and see that the health department receives its share of financial support? How shall we get the ear of the mayor, and how shall we bring him to a full realization of the importance of municipal health problems?

* Read at 38th Annual Meeting of American Public Health Association, Milwaukee, September, 1910.

Too long has the health department remained in a second or third rate position. Too long has the health officer been regarded as a necessary nuisance to be endured, at least during epidemics and plagues. This situation is due to ignorance, which in turn is largely due to our failure to get the facts before the men who control the funds, and to state these facts in such form as to make them convincing. This condition must not be tolerated longer; we must enlighten those who have their fingers on the purse strings.

To this end I propose a conference of mayors and other municipal officials who have to do with the fiscal affairs of cities, for the consideration of municipal health problems; a conference to be held in every state in this nation and in neighboring nations.

An editorial in the New York Evening Post recently asked: "Why should mayors spend time and public money in listening to information that is accessible enough in printed form?" The editor, responding to his own question, said: "The answer is that personal contact among a group of men doing the same work is a way of stirring the enthusiasm that begins to flag under the strain of daily routine. From a two-days' threshing-out of problems, theories, and remedies, a mayor may bring back a vivid realization of public need that no number of printed pages can supply."

The mayor of a modern municipality should be in touch with the times, and abreast of this age of sanitary science, and informed on all questions concerning the health, happiness, and comfort of the people; but there are so many things demanding the particular attention of each particular mayor. "How," he protests, "am I to judge which to attend to?" That is his concern. Ours is, "How is his particular attention to be drawn to the problems of public health?"

To this end I wish it were possible to bring the mayors from all over the land to an annual meeting of the American Public Health Association, and thus get them in touch with the experts of the country in this line of work. I wish it were possible for the American Public Health Association to arrange for the assembled mayors the very best and most practical program, dealing with municipal health problems, that it is possible to plan. Who can measure the effect of such a meeting if it could be brought about? If you could but concentrate the attention of the mayors of all American cities on this subject for one week—aye, for one day; if you could show them all the possibilities in the promotion of public health work in life saving; and, if you could show them, if you please, its political possibilities, what a tremenduous influence for good you could exert, and what a marked gain there would be in this whole field of social endeavor!

Obviously, such a great gathering is quite impossible. Consequently, it looks as though we were doomed to gather together here from year to year, reporting more or less progress, and continuing in the endeavor to enlighten each other. Nevertheless, as sanitarians, we occupy a most enviable position. We actually have more knowledge that we know what to do with, while in most callings the difficulties encountered are chiefly from lack of knowledge. As soon as the knowledge is acquired in most lines of endeavor it spreads like a western forest fire. Compare the rapidity with which the world became acquainted with wireless telegraphy, with the airship, and with a hundred modern inventions in the industrial world, with the slowness of the public to grasp the meaning of the great blessing which was conferred upon humanity by the wonderful discoveries of the late-lamented Dr. Robert Koch, and his contemporaries, in the field of bacteriology and preventive medicine. Compare the countless millions that have been put into the exploitation of knowledge that can be commercialized, with the few thousands that have been reluctantly provided to fight tuberculosis, bubonic plague, smallpox, and other plagues. The world grasps eagerly for every bit of new information for its material development, and is revolutionized. Too often it turns a deaf ear and a skeptical eye upon the man who has made a discovery which will increase the sum total of human happiness by lessening human misery. To the man who gratuitously offers his knowledge to society for its benefit, fame perhaps eventually brings her wreath of laurels, but, as usual, she finds her poet dead.

Notwithstanding this situation, which we have long endured, we are coming gradually to appreciate the truth of what Dr. Osler has so well said: "Measure as you may the progress of the world—materially, in the advantages of steam, electricity, and the other material appliances; sociologically, in the great improvements in the conditions of life; intellectually, in the diffusion of education; morally, in the possibility of higher standards of ethics—there is no one measure which can compare with the decrease of physical suffering in man, woman, and child, when stricken by disease and accident."

It must therefore strike sanitarians as an exceedingly strange state of affairs that in the field of preventive medicine there is an abundance of knowledge that cannot be given away. That is, indeed, a sad situation. What a pity some man could not have patented the fresh air treatment for tuberculosis! He would have been many times a millionaire, and his treatment would have been, no doubt, more popular than Peruna, in which event tuberculosis must long ago have disappeared. In some directions, however, headway has been made. There has been given to the world

a great deal of knowledge concerning smallpox, diphtheria, and, to a great extent, typhoid, and certain other diseases. But this has been done without much help from private capital. It is the public purse that must be looked to for the exploitation of the valuable store of knowledge that has accumulated. Hence, in order successfully to exploit this knowledge, a way must be found to get hold of the man who holds the public purse strings, and to make of him a staunch ally. In most cities that man is the mayor, perhaps in association with other city officials. But, how is his aid to be had, since we can hardly hope to secure the attendance of all these city officials at an annual meeting of this Association?

The next best thing should be done. The best program which we can plan should be presented to the mayors and other prominent city officials in every state, in a conference assembled for the express purpose of its presentation and of its discussion.

Experience has proved that this can be done. Such a conference was recently held in New York State and met with unqualified success. The Conference of New York Mayors, held at Schenectady last June, was attended by thirty-four out of a possible forty-five mayors of second and third class cities, and eight additional cities were represented by officials other than the mayor, making a total representation of forty-two out of forty-five cities. If you want to find out how this phenomenal attendance was secured, write to the Mayor of Schenectady, or to the New York State Charities Aid Association, which was largely responsible for the program and other important details. This conference was, in fact, a splendid example of what can be done through co-operation between an official body and a private organization.

The Conference was called by Mayor Duryee, of Schenectady, and the sessions, extending over two days, embraced a wide variety of subjects pertaining to public health. As a rule, some expert of national reputation was called in to present a carefully prepared paper or an address of about twenty minutes' length. This was followed by informal discussion by mayors, health officers, and other municipal officials, each limited to five minutes.

Among the speakers and the topics discussed were the following:

Mayor Duryee, on "The Protection of Life and the Protection of Property."

Mr. Frederick L. Hoffman, Statistician of the Prudential Life Insurance Company, on "The Prevention of Diseases by the Elimination of Dust."

Mr. Lawrence Veiller, Secretary of the National Housing Association, on "Housing and Health in Cities."

Professor C.-E. A. Winslow, of New York University, on "Waste of Life Capital in American Industries."

Dr. Luther H. Gulick, President of the National Playground Association, on "Municipal Aspects of Rest and Recreation."

Dr. Livingston Farrand, Executive Secretary of the National Association for the Study and Prevention of Tuberculosis, on "Municipal Duties in the Conquest of Tuberculosis."

Dr. Albert Warren Ferris, President of the New York State Commission in Lunacy, on "First Aid to the Insane."

Professor Walter F. Willcox, of Cornell University, on "Methods of Determining Economic Losses from Preventable Diseases."

Hon. Eugene H. Porter, New York State Commissioner of Health, on "The Relation of State Health Authorities to Local Health Authorities."

Dr. George W. Goler, Health Officer of Rochester, N. Y., on "How to Get Competent Health Officers."

Hon. Homer Folks, Secretary of the New York State Charities Aid Association, on "The Organization and Work of an Effective Health Department."

Professor Charles Zueblin, on "The Obligations and Opportunities of Local Officials."

This conference was timely, and it is evident that it dealt with a timely subject. It has stamped public health upon the public mind as a question for first consideration in New York state. Five years ago any one who had suggested that in 1910, 75% of the mayors of New York State, in conference assembled, would have adopted such resolutions as those passed at the Schenectady Conference, would have been deemed a dreamer of dreams. Those resolutions endorsed the municipal control of tuberculosis; in fact, the entire program of the State Charities Aid Association, the watchword of which is "No Uncared-for Tuberculosis in New York State in 1915," received unqualified approval. They endorsed the housing movement, the extension of public parks and playgrounds, and the medical inspection of public schools. They pledged their unqualified support of the movement for a national department or bureau of health, and for the protection of the cities' food supply. They went on record as strongly favoring special training for health officers, and permanent tenure for such officials: and as an eminent authority has recently said, "The education of health officers is indeed one of the crying needs of rural America; the removal of this office from politics, dignifying it by providing suitable compensation and definite preparation for its duties would save life and health as no other single reform in the field of social welfare, with the possible exception of the further socializing of the schools." Finally, the resolution passed by these mayors pledged them to use their utmost endeavor to secure much more liberal appropriations for health work in cities.

In a conference such as I have proposed, city officials who control the expenditure of public funds can be most emphatically impressed, not only with the great public need in this direction, but also, as I have already

suggested, with the political possibilities which are inherent in it. Dr. Devine, in his recent book, "Misery and Its Causes," has stated the whole argument which should confront the mayors in an admirable manner, and I can do no better, in closing, than to quote it:

"No community," says Dr. Devine, "is so poor that it can afford to permit typhoid for the lack of a filter, or inefficient children for the lack of good schools, or criminals for the lack of playgrounds, or wayward girls for lack of protection, or exploited childhood for the lack of a factory inspector, or industrial accidents for lack of a compensation law or an insurance system. These things, I repeat, are not luxuries. * * * * * * Economic prosperity is essential, and I would be the last to argue in favor of reckless waste of resources. Sanity in expenditures is as necessary in social betterment as in private business. I urge the sanity, the reasonableness of combatting the causes of misery, that we may not have to pay for its consequences. We may send children to school, keep them out of factories, provide them with playgrounds, operate for their adenoids and fit them for useful trades and occupations; or we may keep our hospitals and courts and prisons and charities going at their maximum capacity. We are right or wrong in the position that these are alternatives. If we are right, these expenditures and enactments, designed to change the adverse conditions, are serious policies; not indulgences to be allowed half good naturedly and half indifferently, if there happens to be plenty of spare money about not required for other purposes. Of course, the money must be available or it cannot be spent, but if the advocates of better social conditions, of education and health and room and leisure and recreation and reasonable standards are in earnest, if they make it clear that the irreducible minimums of these things which they seek, and which they seek not only through municipal expenditure, but in a large part through voluntary co-operation and individual initiative, represent investment and not luxury, they will, I think, escape the reproach of youthful extravagances and of having neglected finance for the more alluring but less firmly grounded social science."

If municipal health problems are placed before the mayors of the cities of any enlightened commonwealth in the light here suggested by Dr. Devine, I believe that the program is sure to capture them. To get this movement under way in any state, it is necessary only to present its possibilities to some wide-awake and popular mayor,—and it might not hurt the cause to mention the fact that the Democratic leaders of the State of New York are now talking of the mayor who originated the Schenectady Conference as a desirable candidate for Governor of the Empire State.

VITAL STATISTICS IN THE PROMOTION OF PUBLIC HEALTH.

By WILLIAM H. GUILFOY, M. D.,
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Newsholme has defined Vital Statistics as the science of numbers applied to the life history of communities and nations; Wilbur, as the Cinderella of modern public hygiene, sitting in the chimney corner sifting the ashes of dusty figures while the proud sisters, Bacteriology and Preventive Medicine, go to the ball, and talk about the wonderful things they have done. The term might also be defined as the numerical registration and tabulation of population, marriages, births, diseases, and deaths, coupled with analyses of the resulting numerical phenomena with the end in view of "searchlighting" the path of sanitary progress.

The basis of all vital statistics is the population as furnished by the census, with its various subdivisions as to locality, age, sex, race, civil condition, density, occupation, and similar information. During the intercensus years, estimates must be made of the population based upon an arithmetical or geometrical progression; upon this base must take place the building of a superstructure, in fact, a store-house, containing the essential requisites of all knowledge of health, fecundity, prosperity, disease, and death. This thought prompts the query, "If a life assurance company can erect in the City of New York a palatial skyscraper, paid for by its knowledge of mortality rates transmuted into dollars and cents, why should not the federal government be able to erect at its seat a monumental temple of vital statistical lore, surpassingly beautiful and practical, and paid for by the increased economic value of the health of the nation?"

Marriage statistics form an interesting part of the subject, by reason of their bearing upon the increase of the population and their use as an index of worldly prosperity. The full registration of births occurring in a community is of great value from the viewpoint of the vital statistician, and yet it must be admitted that very few of the cities, not to speak of the states, in the United States, are in receipt of 90 per cent. of reports of births occurring within their limits. In Great Britain and in Europe the ordinary measure of the mortality among infants under one year of age is the number dying per 1000 births, as reported during the year; in the United States at the present time such a standard could not be set up in any one

state, and in very few cities. The birth rate of a community has a far-reaching influence upon the increase of population, age, and sex constitution of its people, and questions of social interest, such as fecundity of native "stock", illegitimacy, and divorce.

The most important subject with which this paper deals is the consideration of the question of mortality and mortality rates. Sweden, in the year 1749, first entered the field of mortality statistics; and probably the first tabulation of deaths must have been brought about by the occurrence shortly before this date of a death-dealing epidemic of such magnitude that it aroused a desire to know how many died—a desire resolving into a demand—with the result that for 150 years death rates at various age-groups are in existence. It is not surprising that the lowest rate of mortality in Europe is to be found in the Scandinavian peninsula; in other words, where the lamp of vital statistics was first kindled, there is to be found a progressively healthy and vitally vigorous nation. If the pathway be made light, then shall the feet of the hygienist not go astray in the teaching of man to lead a happier, healthier, and longer life.

The chief and noblest aim of the vital statistician is to point out how, when and where the best efforts of the health officer and hygienist may be directed to conserve health; his analysis of returns will show what forces have been at work in the past tending toward the suppression of all the various forms of destructive disease, at what psychological moment these forces should be put into operation, and at what point action should be begun. Deaths and causes of deaths are facts which may be classified, tabulated, and analyzed, and the statisticians' presentation of the various factors influencing health and life creates laws which may not be disobeyed, save under penalty of painful disease and perhaps death. "Diseases are the iron index of misery," and the complete registration of ALL diseases with attendant conditions of congestive contact, social excesses, vicious indulgences, and hygienic ignorance, shall form in the future the basis of official and philanthropic intervention.

Improved vital statistics is the demand of the hour, and in so far as further progress is made in this direction, so far will corresponding advance be made in preventive medicine. The day of comparing the salubrity of a town, city, state, or nation with that of another by the use of the crude death rate is passed; the constant repetition of the warnings given in the past, that the crude death rate should not be used in this manner, is bearing fruit. It may be, and is, used constantly and properly in the comparison of the mortality of a locality with that of its past, provided no great change has occurred in the sex and age constitution of the population; the two factors last mentioned are the most important in the determination

of the death rate of a locality. It has been repeatedly shown that, given two cities with varying age-groupings of the populations, but with exactly the same DEATH RATES at these age-groups, one city will possess a much lower general death rate than the other, due not to more healthful environment, but to the more favorable distribution of ages of the inhabitants; sex distribution modifies the death rate, the presence of a larger proportion of females than males in a population always tending to lower the rate. In connection with this subject, I would earnestly recommend that the Bureau of the Census establish a standard table showing the death rates by sex and by age-groups, the application of which to the returns of cities and states would serve to do away, in a great measure, with the disturbing influence of these two factors. Some of our cities display in bold-faced type upon the front page of their weekly or monthly reports—as if inviting attention to the extreme healthfulness of the locality—a general death rate of 10 per 1000, which means that either every child born attains the age of one hundred years, or else that the average age at death is one hundred, or if some die in infancy, others must have lived much more than one hundred.

Density of the population is a factor which influences the death rate, a factor which formerly was considered as most directly concerned with increased mortality, and for the correction of its influence upon the death rate mathematical formulas were worked out. It is now viewed as of secondary importance, compared with the immediate hygienic surroundings, the habits, and intelligence of the dwellers; of these latter influences, the infant mortality is a good index. In the City of New York, where the number of persons in one block reaches the astounding mark of 2471 per acre, the number of children dying out of every 1000 births was one-half the number dying in blocks with a density less than one-half; it must be admitted though, that all blocks with a density of 1000 to the acre showed an increase in the infant mortality as compared with that of the entire city. A second factor is the nativity of parents. The infant mortality in a block inhabited by Russian Poles was 166; by Italians 165; by Irish and German mixed 204; by wealthy native white 50; by middle class native white 121; by native colored 319. The influence of the presence of the colored population upon the death rate is well known, and the experience of Southern cities is amply corroborated by that of areas in Northern cities occupied by blacks; the highest infant mortality is always to be found in San Juan Hill, a typical colored section.

Hoffman, in his paper on the "General Death Rate of Large American Cities," enumerates the following factors as affecting the rate: Size of city, density of population, latitude, longitude, elevation, rate of annual

increase, proportion of males, of foreign born, of foreign parentage, of colored, of illiterates, of male wage earners, of ages, the mean annual maximum and minimum temperatures, and mean annual relative humidity; so that the general death rate, when analyzed, is found to be based upon a very complex set of props, and the influence of the most important must be measured before accepting of it as an index of mortality.

The vital statistician must prepare his tables of mortality in such a way as to show the CAUSES of death, not only by weekly, monthly, and yearly occurrence, but he must, for purpose of comparison, furnish quinquennial or decennial figures corrected to correspond with fluctuations of the population; tables showing the number of deaths and rates at divisional ages, especially among infants and children under five years and between five and nineteen years, should be compiled. Of surpassing importance is the registration of deaths by house and street, with cause and age specified, in order that the epidemics may be traced, studied and prevented. Tables of deaths from the principal causes should be prepared, arranged according to race, nativity of deceased, and parents of deceased; deaths from accidental causes should be presented in detail; deaths in institutions should be charged up against the locality where the deceased resided before admission; areas of sanitary interest should be mapped out and mortality and morbidity rates published; mortality rates, arranged according to specific occupation and by age divisions, are much sought for at present, and will continue to be sought by reason of the awakened public interest therein; suicide tables should be printed according to the method used, nationality and age tabulated, but not excluded from the regular mortality tables published. I hope the day is not far distant when the Bureau of the Census will be in a position to redistribute deaths occurring in any part of the country to their proper place.

Before closing, I should like to call attention to the results obtained in the City of New York (since the organization of the Board of Heatlh more than forty years ago,) the rates and causes of death of the first decennium being compared with those of the decennium just ended. The crude rate has decreased from 26.61 to 16.21, almost 40 per cent.; the decrease per cent., at age-groups representing infancy, childhood, youth, maturity, decline, and old age, was as follows: Infancy 45, childhood 42, youth 32, maturity 25, decline 3, old age 6; the death rate among females, as compared with males, is lower in each decennium and at each age-group; the per cent. reduction in the rate among the females has equaled or surpassed that among the males at every age-group in the comparison. Under the age of fifteen years, and above the age of forty-five, the degree of reduction is almost the same, while between twenty-five and forty-five

years of age the reduction is much greater among the females; by far the greatest saving in human life has taken place before the age of forty-five, and above this latter the saving is comparatively very small. Those causes which the Department of Health has sought to eradicate have reflected their disappearance or abeyance in the absent or diminished mortality of smallpox, typhus fever, Asiatic cholera, typhoid fever, diphtheria and croup, measles, scarlet fever, whooping cough, tuberculosis and diarrheal diseases,—causes which affect mankind before and during maturity; while, on the other hand, those in the control of which no official interference has been attempted have increased tremendously, especially cancerous, circulatory, and urinary diseases. To a lesser extent the mortality from acute respiratory diseases has increased; judging from calculations made two years ago the decreased mortality from tuberculosis at the ages over 45 years has had the effect of turning what would have been an increase from all causes to a very slight reduction at the decline period of life.

It is also evident that the entrance of the female into the business world has not been followed by an increased mortality at any age-group, as compared with the male; and if we consider the ages 25 to 45 years as the most productive in a social and economic sense, we find that it is at these ages that the decrease in the mortality of the female, as compared with the male, is greatest. The work assumed by the female has not added to her mortality, it has brought greater physical comforts and increased her span of life.

The rungs at the bottom of the ladder of life are being carefully looked after; those at the middle of the ladder have been neglected; the physical welfare of the man has been lost sight of in the multitude of attempts at prolongation and betterment of the physical properties of the child. Words of praise should be bestowed upon these official and philanthropic endeavors to make the coming generation "fit"; but is it not time that the vital statisticians should show us by investigations that the mortality from the diseases affecting middle age is increasing—the diseases of the kidney, heart, arteries, brain and digestive organs, which are growing apace —in order that man may be educated into following the ordinary rules of morality, sobriety, and moderation in all things, even in work? Light, more light, is necessary, otherwise "the millenium when," as Isaiah says, "the child shall die a hundred years old," shall never materialize.

Laboratory Section

REPORT OF THE JOINT COMMITTEE ON MAILING INFECTIOUS MATERIAL.

Your Committee has to report that the proposed modifications of the regulations for the mailing of infectious material have finally been promulgated by the Post Office Department, under date of April 22, 1910.

The committee believes that its efforts have resulted in the promulgation of regulations which have been considerably simplified, and which are a decided improvement over those formerly enforced.

The committee was successful in having the privileges of the mails extended to include the transmission of infectious material to and from federal, state, municipal, and other laboratories, upon the issuance of a formal permit by the Postmaster-General.

A copy of the new regulations is herewith appended.

Your committee recommends that it be discharged.

Respectfully,

JOHN F. ANDERSON,
for the Association,

MARSHALL LANGTON PRICE,
for the Laboratory Section.

ADMISSION OF DISEASED TISSUES, ETC., TO THE MAILS OF THE UNITED STATES.

SECTION 495, P. L. AND R., AS AMENDED BY THE POSTMASTER GENERAL'S ORDER, NO. 3064, APRIL 22, 1910.

Section 495, Postal Laws and Regulations, is hereby amended to read as follows:

Specimens of diseased tissues may be admitted to the mail for transmission to United States, State, municipal, or other laboratories in possession of permits referred to in paragraph 3 of this section, only when inclosed in mailing cases constructed in accordance with this regulation: PROVIDED, That bacteriologic or pathologic specimens of plague and cholera shall under no circumstances be admitted to the mails.

2. Liquid cultures, or cultures of micro-organisms in media that are fluid at the ordinary temperature (below 45 C. or 113 F.), are unmailable. Such specimens may be sent in media that remain solid at ordinary temperature.

3. No package containing diseased tissue shall be delivered to any representative of any of said laboratories until a permit shall have first been issued by the Postmaster General certifying that said institution has been found to be entitled, in accordance with the requirements of this regulation, to receive such specimens.

4a. Specimens of tubercular sputum (whether disinfected with carbolic acid or not disinfected) shall be transmitted in a solid glass vial with a mouth not less than one inch in diameter and capacity of not more than two ounces, closed by a cork stopper or by a metallic screw top protected by a rubber or felt washer. Specimens of diphtheria, typhoid or other infectious or communicable diseases or diseased tissues shall be placed in a test tube made of tough glass, not over one-half inch in diameter and not over three and one-half inches in length, closed with a stopper of rubber or cotton and sealed with paraffine or covered with a tightly-fitting rubber cap.

b. The glass vial or test tube shall then be placed in a cylindrical tin box made of I. C. bright tin plate, with soldered joints, closed by a metal screw cover with a rubber or felt washer. The vial or test tube in this tin box shall be completely and evenly surrounded by absorbent cotton, closely packed.

c. The tin box with its contents must then be inclosed in a closely-fitting metal, wooden or papier-mache block or tube, at least 3-16 of an inch thick in its thinnest part, of sufficient strength to resist rough handling and support the weight of the mails piled in bags. This last tube to be tightly closed with a metal screw cap.

5. Specimens of blood dried on glass microscopic slides, for the diagnosis of malaria or typhoid fever by the Widal test may be sent in any strong mailing case which is not liable to breakage or loss of the specimen in transit.

6. Upon the outside of every package of diseased tissues admitted to the mails shall be written or printed the words "Specimen for Bacteriological Examination. This package to be pouched with letter mail. See Section 495, P. L. and R."

REPORT OF THE COMMITTEE ON STANDARD METHODS FOR THE BACTERIAL DIAGNOSIS OF GLANDERS.

Since the report of this committee in 1907, the methods of bacterial diagnosis have been reviewed and considered. At the outset of this work 150 question blanks were sent to get an expression of opinion from American veterinarians and Health Officers on the methods of diagnosis now in use. Of 150 blanks, 40 were returned. A study of these questions answered shows that mallein holds a prominent place. Microscopical agglutination is used to a very small extent, and the Straus method somewhat extensively in a few places, but in other places only as a last resort in clinical cases.

A few, however, condemned mallein, but in all cases it would appear that they were not justified in so doing for the reasons stated. Whatever method is used, great care must be taken in verifying the bacterial diagnosis with post-mortem examinations. It is a well-known fact that a positive bacterial diagnosis can be made and *Bact. mallei* recovered in pure cultures, when the lesions are but slight or perhaps have not assumed a typical appearance. Wladimiroff has shown that *Bact. mallei* can occasionally be recovered in pure cultures from the bronchial lymph glands that show no gross lesions, taken from horses that have reacted to mallein. It would seem that some of our American veterinarians have been too hasty in condemning bacterial methods now in use, particularly mallein.

The diagnosis of glanders in the living individual consists of one of three procedures, namely:

1. The mallein test.

   (The three indications of reaction should be carefully observed, the reaction usually consisting of two of the three following disturbances: temperature, local swelling, and constitutional symptoms.)

2. Blood tests.

3. A bacterial examination of the discharge from the nasal cavities, or the contents of the skin abscesses of the suspected individual. For this the inoculation of a male guinea-pig by the Straus method is recommended.

It is of interest to report the results in tabular form of thirty independent workers on mallein testing and blood tests.

TABLE I.

Cases of glanders proved by clinical, bacteriological, or anatomic methods and correctly confirmed by mallein, agglutination, or complement fixation.

Reference	Complement Fixation	Agglutination	Mallein Subcutaneously	Ophthalmo Reaction	Cuti-Reaction
Dietrich[1]	..	..	..	6	..
de Blieck[2]	8	7	16	22	..
Nevermann[4]	..	137	..	..	..
Nevermann[5]	..	119	..	..	..
Nevermann[6]	75	14	..	..	..
Christensen[7]	..	..	..	2	..
Schlegel[8]	..	..	73	..	..
Riemer[9]	..	2	..	..	..
Pirl[10]	..	..	10	..	..
Feist[11]	..	..	70	..	..
Kitt[12]	..	..	15	..	..
" [13]	..	..	151	..	..
Alete[14]	..	..	1	..	..
Semmer[15]	..	..	22	..	..
Preusse[16]	..	..	37	..	..
de Haan J. Hoogkame[17]	..	..	25	..	..
Martel[19]	..	..	..	10	6
Liautard[20]	..	..	14	..	..
Lambkin[21]	..	..	1	..	..
Siegmund[22]	..	..	1	..	..
McLean[23]	..	..	1	..	..
—— [24]	..	..	1	..	..
Blackman[25]	..	..	1	..	..
Rutherford[26]	..	..	4	..	..
Sudmersen[27]	..	..	19	..	..
Lavalard[29]	..	..	810	..	..
Total	83	279	1272	40	6

TABLE II.

Cases in which a negative mallein, agglutination, or complement fixation reaction was sustained by clinical, bacteriological, or anatomic evidence.

Reference	Complement Fixation	Agglutination	Mallein Subcutaneously	Ophthalmo Reaction	Cuti-Reaction
de Blieck[2]	..	..	1	1	..
Wladimiroff[3]	..	..	16	16	..
Christensen[7]	..	..	..	76	..
Schlegel[8]	..	..	23	..	..
Pirl[10]	..	..	12	..	..
Feist[11]	..	..	2	..	..
Preusse[16]	..	..	32	..	..
Liautard[28]	..	..	6	..	..
Total	..	..	92	93	..

TABLE III.

Cases in which a positive mallein, agglutination and complement fixation reaction was not sustained by clinical, bacteriological, or anatomic evidence.

Reference	Complement Fixation	Agglutination	Mallein Subcutaneously	Ophthalmo Reaction	Cuti-Reaction
Nevermann[4]	..	34	..	..	..
Nevermann[5]	..	25	..	..	..
Nevermann[6]	4	..	..	..	..
Schlegel[8]	..	..	6	..	..
Riemer[9]	..	1	..	..	..
Feist[11]	..	..	1	..	..
" [13]	..	..	22	..	..
Alete[14]	..	..	2	..	..
Preusse[16]	..	..	4	..	..
Sudmersen[27]	..	..	1	..	..
Total	4	60	36	..	..

TABLE IV.

Cases of glanders proved by clinical, bacteriological, or anatomic methods, in which mallein, agglutination, or complement fixation failed to reveal.

Reference	Complement Fixation	Agglutination	Mallein Subcutaneously	Ophthalmo Reaction	Cuti-Reaction
Dietrich[1]	..	..	..	7	13
Riemer[9]	..	2	..	..	..
Preusse[16]	..	..	1	..	..
Valles et Pamisete[8]	..	..	5	..	..
Martel[19]	..	..	..	9	7
Sudmersen[27]	..	..	7	..	..
Lavalard[29]	..	..	2	..	..
Total	..	2	15	16	20

TABLE V.

Positive cases of glanders, tested by mallein, complement fixation, and agglutination.

Test	Total	Correct		Faulty	
		Number	%	Number	%
Complement Fixation	83	83	100	..	..
Agglutination	281	279	99.21	2	.79
Mallein-subcutaneously	1287	1272	98.83	15	1.17
Ophthalmo Reaction	56	40	71.43	16	28.57
Cuti-reaction	26	6	23.07	20	76.93

TABLE VI.

Cases free from glanders and tested by mallein, complement fixation, and agglutination.

Test	Total	Correct		Faulty	
		Number	%	Number	%
Complement Fixation	4	4	100	..	..
Agglutination	60	..	..	60	100
Mallein-subcutaneously	128	92	71.87	36	28.13
Ophthalmo Reaction	93	93	100	..	..
Cuti-reaction	..	..	..	..	..

TABLE VII.

Analysis of positive mallein, complement fixation, and agglutination reactions.

Test	Total	Correct		Faulty	
		Number	%	Number	%
Complement Fixation	87	83	95.40	4	4.60
Agglutination	339	279	82.30	60	17.70
Mallein subcutaneously	1308	1272	97.24	36	2.76
Ophthalmo Reaction	40	40	100	..	..
Cuti-reaction	6	6	100	..	..

Table VIII.

Analysis of negative mallein, complement fixation, and agglutination reactions.

Test	Total	Correct		Faulty	
		Number	%	Number	%
Complement Fixation	..	..	..	..	..
Agglutination	2	..	..	2	100
Mallein subcutaneously	107	92	85.98	15	14.02
Ophthalmo Reaction	109	93	85.32	16	14.68
Cuti-reaction	20	..	..	20	100

TABLE IX.

Statistics presented by Schnurer (30) at the Ninth International Veterinary Congress.

2500 Horses; 190 Autopsies; 102 Glanders; 88 Glanders-free.

Agglutination		Mallein Sub. Q.		Cuti-Reaction	
184 Autopsies	97 Gl. 87 Gl. fr.	64 Autopsies	30 Gl. 34 Gl. fr.	68 Autopsies	36 gl. 32 gl. fr.
		Correct Results.			
Gl. 87.5%	82.5%	Gl. 86.3%	90.0%	Gl. 92.7%	97.2%
Gl. fr.	93.1%	Gl. fr.	82.4%	Gl. fr.	87.5%
		Faulty Results.			
Gl. 12.5%	17.5%	Gl. 13.7%	10%	Gl. 7.3%	2.8%
Gl. fr.	6.9%	Gl. fr.	17.6%	Gl. fr.	12.5%

Ophthalmo reaction		Endodermal reaction		Fever with local react.		Combined Method.*	
69 Autopsies	37 Gl. 32 Gl. fr.	31 Autopsies	14 Gl. 17 Gl. fr.	34 Autopsies	23 Gl. 11 Gl. fr.	98 Autopsies	52 Gl. 46 Gl. fr.
			Correct	Results.			
Gl. 95.7%	97.3%	G.l 87.1%	92.9%	Gl. 85.2%	100 %	Gl. 93.8%	100 %
Gl. fr.	93.8%	Gl. fr.	82.4%	Gl. fr.	54.5%	Gl. fr.	86.9%
			Faulty	Results.			
Gl. 4.3%	2.7%	Gl. 12.9%	7.1%	Gl. 14.8%	...	Gl. 6.2%	...
Gl. fr.	6.2%	Gl. fr.	17.6%	Gl. fr.	45.5%	Gl. fr.	13.1%

* Combined method: Agglutination plus local reaction or subcutaneous.

From the foregoing tables it will be seen that complement fixation, agglutination, and mallein are the most reliable methods of diagnosis we have. It is the opinion of this committee that rules for judging a bacterial reaction should not be too closely drawn, as many times sanitary authorities have good reasons for making minor changes that would not affect the efficiency of a test.

THE MALLEIN TEST.

The International Veterinary Congress, held at the Hague in 1905, adopted uniform principles for judging a mallein reaction. The following rules which this committee recommends do not differ materially from those adopted by the International Congress, as it seems well to have as much uniformity as possible in mallein testing.

1. From a diagnostic standpoint the mallein reaction can only be considered positive when it produces a typical reaction.

2. A reaction is typical when the temperature rises at least 4° to a temperature of over 104°, and during the first day the fever line should show a plain or two summits, and on the second day, and sometimes even on the third day, a higher elevation is reached. The rise in temperature is accompanied with a local or general reaction.

3. The elevations below 104°, and those without a typical reaction, demand a re-examination.

4. The slow rising to a stationary high temperature proves glanders, even when it otherwise deviates from a typical reaction.

5. The typical local swelling at the place of injection, if accompanied by clinical symptoms, is a positive sign of glanders, even when the rise in temperature, and also the general organic reaction, is absent.

6. All contact animals submitted to the mallein test, whether they give a doubtful reaction or not, should always be tested the second time in from 10 to 30 days.

7. The production of mallein should be carried out exclusively in state or endorsed scientific institutions, or in those under municipal, state, or government supervision.

THE AGGLUTINATION TEST.

The advantages of the agglutination test are that the blood can be drawn by veterinarians unskilled in the use of mallein and sent to a laboratory where the work of testing can be done by experienced men. It can also be employed when the horse's temperature is abnormal, a condition which may prevent the use of mallein, and, further, it is possible to employ it with blood taken from an animal at the time of death. It sometimes happens that the agglutination test gives a positive result when mallein has failed. A few post-mortem examinations of cases of this kind which have come under the observation of members of the committee have revealed lesions of glanders.

The method recommended for making the test, which is practically the same as that proposed by Schutz and Meissner in 1905, is as follows:

1. Procure a pure culture of *Bact. mallei* that will not agglutinate in low dilutions of normal serum and that will agglutinate in glandered serum in dilutions of from 1-500 to 1-1000.

2. Procure the blood from the suspected horse in a clean sterilized bottle. It can be drawn from the jugular vein with a sterile hypodermic needle.

3. As soon as the serum is formed it should be drawn off and diluted 1–40 in a physiological salt solution.

4. In making the test, three c. c. of the test fluid is placed in each of several small test tubes. The diluted serum is added to the test fluid with a small pipette, and thoroughly mixed. In making the different dilutions, the amount of diluted serum to be used is readily ascertained by the following table:

Dilution of serum	Amount of serum diluted	Amount of test fluid	Dilution
1–40	1.2 c. c.	3 c. c.	1–100
1–40	0.6 c. c.	3 c. c.	1–200
1–40	0.405 c. c.	3 c. c.	1–300
1–40	0.3 c. c.	3 c. c.	1–400
1–40	0.24 c. c.	3 c. c.	1–500
1–40	0.195 c. c.	3 c. c.	1–500
1–40	0.15 c. c.	3 c. c.	1–800
1–40	0.12 c. c.	3 c. c.	1–1000
1–40	0.105 c. c.	3 c. c.	1–1200
1–40	0.09 c. c.	3 c. c.	1–1500
1–40	0.06 c. c.	3 c. c.	1–2000
1–40	0.03 c. c.	3 c. c.	1–4000
1–40	0.015 c. c.	3 c. c.	1–8000

The mixture thus prepared is placed in an incubator at 37° C. for from twenty-four to seventy-two hours. A temperature higher than 37° C. interferes with agglutination.

The test fluid is prepared as follows: Acid-glycerine agar cultures of *Bact. mallei* about 72 hours old are used. The growth is washed from the culture into distilled water containing 0.85 per cent. sodium chloride. This suspension is then placed in a thermostat at 60° C. for two hours, which kills the organism; a temperature higher than 65° C. or lower than 60° C. should be avoided. After heating, the suspension is thoroughly triturated and filtered through sterile cotton. The filtrate thus prepared is diluted with the salt solution containing 5% of carbolic acid crystals, until it is of a faintly cloudy appearance. The test fluid gives the best results when made with freshly prepared carbolized-salt solution.

5. The reaction consists of a layer of the agglutinated bacteria, covering the entire concavity at the bottom of the tube. This film-like sediment may become so dense that it rolls in at the periphery. The supernatant fluid becomes clear in the lower dilutions, but in the higher ones the clarification may not be complete, a condition which shows that all the bacteria have not become agglutinated. This is further evidenced by the fact that the layer is less dense in the higher dilutions. The reaction may begin in six hours, but cannot be considered complete until from twenty-four to thirty-six hours have elapsed. In case of no reaction the specimen should be kept for 72 hours before reporting it as negative.

6. Diagnosis. As the serum of normal horses usually agglutinates in dilutions of 1–200 and more rarely in 1–400, it is recommended that a reaction in a dilution of 1–500 should be looked upon as suspicious, and one in a dilution of 1–800 or higher should be considered as evidence of infection with glanders.

7. It is recommended that the macroscopic reaction should be used for diagnosis rather than the microscopic. This is because of the too frequent partial clumping of the organisms as detected by the microscope in dilutions of normal serum. Perhaps with much practice with this method, it would be an aid in diagnosis.

THE STRAUS METHOD OF DIAGNOSIS.

Straus' method of diagnosis can be considered reliable when a positive result is obtained. In case of a negative result it cannot be considered conclusive. There are occasionally atypical lesions in the guinea-pig, and once in a while lesions will not develop when *Bact. mallei* is present. The amount of material to inject is a difficult question to decide. It is advan-

tageous to give as large a dose as possible without killing the guinea-pig with septicemia due to other organisms, as large doses hasten the development of the disease and are more accurate. The size of the dose may be regulated to some extent by staining smears of the suspected material to see how many bacteria are present, paying particular attention as to whether streptococci are present or not; or an agar spread culture may be made which will indicate the number and variety of organisms present. In the meantime the suspected material should be frozen. Freezing for a few days will kill a great variety of organisms, but *Bact. mallei* will withstand 15° to 20° F. for several weeks. In all cases it is advisable to inoculate at least two full-grown male pigs. Inoculations should always be made about ¾ intraperitoneally and ¼ subcutaneously, for otherwise not infrequently the only result will be a subcutaneous glanders abscess at the point of inoculation. The diagnosis should usually be based on the development or non-development of the testicular lesions, which usually appear in from two to seven days from the time of inoculation. Smears and cultures should always be made from the testicular or other lesions.

A positive result is, therefore, based: First, on characteristic testicular lesions; second, on characteristic bacilli in the smear; third, on characteristic bacilli in the cultures made from the testicular or other lesions. It is very seldom that guinea-pigs die within 24 hours from glanders, although such cases have been observed. Pigs dying within 48 hours should always be autopsied, and cultures taken as a general septicemia may be caused by the glanders organism. It is advisable to keep guinea-pigs that do not show lesions at the end of the 7th day for at least one month, in order to rule out any possibility of late development of lesions.

This committee has shown that in 40 cases the average time from inoculation to the development of symptoms was two days, excluding eight delayed cases. Occasionally lesions were encountered such as abscesses of the leg, mesentery, or testicles adherent to the abdomen.

It is advisable to take cultures from the suspected material on suitable culture media, such as potato, as it has been shown by the committee that occasionally the Straus reaction will be negative and the cultures positive.

TABLE SHOWING CASES, DOSAGE, AND RESULT OF CULTURES.

	Total
Cases positive	301
Receiving 1 and .5 c. c	283
Receiving .5 and .25 c. c	18
Streptococci present	20
Swabs positive, pigs positive	21
Swabs positive, pigs negative	11

	Total
Suspicious bacilli present in examination of smears from swabs	77
Followed by positive culture	8
Followed by negative culture	32
Overgrown by mold	36
Showing no growth	1
Swab cultures negative	132
Swab cultures positive	32
Mold	126
No growths	3

The following conclusions are drawn by this committee:

1. That mallein is the most reliable practical method that we have of diagnosing glanders.

2. That the agglutination test is a very valuable aid in diagnosing glanders, and, in some cases, can be employed where conditions prevent the application of other tests.

3. Straus' method is reliable in clinical cases where a positive reaction is obtained in the pig and *Bact. mallei* recovered in pure cultures from the lesions.

4. It is advisable to make cultures in suitable culture media, such as glycerine potato, from the suspected material when Straus' method is employed.

5. Complement fixation is very reliable, but is probably too tedious and complicated for routine procedure.

6. Cuti-reaction and ophthalmo reactions with mallein have shown very poor results.

W. L. BEEBE, Chairman.
V. A. MOORE,
HAROLD C. ERNST,
L. VAN ES,
B. L. ARMS.

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Section on Vital Statistics

OCCUPATIONAL STATISTICS FOR TUBERCULOSIS IN WISCONSIN.*

By L. W. HUTCHCROFT,
Statistician, Wisconsin State Bureau of Vital Statistics.

The subject of occupation in its relation to deaths from various diseases, particularly tuberculosis, has not received the attention which should be given to so important a matter. The most valuable contribution to the subject of occupation, in its relation to deaths from tuberculosis, has been prepared by Frederick L. Hoffman, of the Prudential Life Insurance Company. The investigations made by Mr. Hoffman, and the work done by several of the state departments of health, indicate that there is a very clearly defined causal connection between deaths from tuberculosis and certain occupations.

The so-called dusty trades are generally considered to be especially conducive to the disease. This observation is confirmed by the statistics which I shall present. Of the seven occupations showing high death rates from tuberculosis, six may very properly be classified as dusty trades. These occupations are as follows: glass blowers and glass workers; cabinet makers and upholsterers; plasterers and whitewashers; mill and factory operatives (textiles); cigar makers and tobacco workers, and machinists.

The statistics which I shall use are unreliable in two important particulars, as will be shown later. Only a short time ago, whenever an investigator attempted to make a study of mortality statistics in general, or the deaths from any disease for the whole or any considerable part of the United States, he was compelled to preface his remarks with a statement that the record of deaths is incomplete, and hence the statistical compilations do not reveal the conditions as they exist. I am in a similar position in attempting to treat the subject which has been assigned to me.

* Read before the Section on Vital Statistics of the American Public Health Association, Milwaukee, September, 1910.

Through the efforts of Dr. Cressy L. Wilbur, and the co-operation extended by the American Medical Association and the American Public Health Association and similar organizations interested in public health problems, this condition is rapidly disappearing. In addition to the great results accomplished by the accurate registration of deaths, the nomenclature of causes of death has been standardized, thus bringing about a condition of uniformity for the entire registration area. What I shall have to say about the relation of occupation to deaths from tuberculosis will be only secondary to an effort to show the necessity for uniformity and accuracy in the statement of occupational statistics, and to an attempt to show the importance of revising the list of occupations to be considered at certain stated intervals.

At the 1908 meeting of the American Public Health Association, I prepared a paper on "The Mortality from Industrial Diseases," which was read before one of the meetings of this section. At that time I tried to emphasize the importance of obtaining for record the present occupation of the DECEASED and the former occupation, if any, with the duration of each. This was in line with the work being done at that time by Dr. Wilbur, of the Federal Census Office, and I am pleased to state that he has brought about a change in the standard form of death certificate which will make it possible to obtain a complete "occupational history" for every death recorded. This completes the first requirement necessary for a satisfactory study of deaths and death rates for the various occupations.

Before it can be shown what occupations are especially conducive to certain diseases, or in what industries the death rate is abnormal, we must have some means of determining, approximately, the number of individuals employed in each industry or occupation. To accomplish this there must be uniformity of classification and accuracy in the collection of the data by the federal government, and by the states, where a state census is provided for. The death rates from tuberculosis for each occupation, which I shall give later, are based on the federal census reports for 1900, the most accurate statistics obtainable. The Wisconsin State Census, which was taken in 1905, does not provide the same classification of occupations as is used by the federal government, and in cases where the nomenclature is the same, the element of error is so great that the figures are unreliable. I am heartily in favor of adopting a plan which will standardize the nomenclature of occupations, and which will provide for the periodical revision of the classification, so as to include new occupations and industries and discard or combine others as new conditions arise. If such a plan were adopted in taking the Federal Census, and the

registration states were requested to use the same classification when the state census is taken, it would be possible to provide a reliable estimate of the number of persons engaged in each industry for any given period of time. Until this is done our statistics of occupations will be of little value in most states, and the relation of occupation to disease cannot be satisfactorily determined.

The death rate from tuberculosis in Wisconsin during the twenty-seven months from October 1, 1906, to December 31, 1908, based on an estimated population in 1907 of 2,295,000, is 238 per 100,000 population. The death rate by OCCUPATIONS for this period varies from 1,677 per 100,000 population, for glass blowers and glass-workers, to 66 per 100,000, for boatmen and canalmen.

With a given rate for the entire state of 238, the following classes of workers appear to be especially susceptible to tuberculosis; glass-blowers and glass-workers, clock and watch repairers and jewelers; cabinet-makers and upholsterers; plasterers and whitewashers; mill and factory operatives (textiles); cigar-makers and tobacco workers; machinists; journalists; saloon-keepers, etc.; architects, artists, etc.; tinners and tinware makers; plumbers, gas and steam fitters; and musicians and teachers of music.

The highest rate shown, based on the records of 5,484 deaths from tuberculosis, is 1677 per 100,000 for glass-blowers and glass-workers. Next come clock and watch repairers and jewelers with 1567;* cabinet-makers and upholsterers rank third, with a rate of 1353; plasterers and whitewashers have a rate of 1242; mill and factory operatives (textiles) 1070; cigar-makers and tobacco workers 994; machinists 981; journalists 981; saloon-keepers, etc., 925; architects, artists, etc., 931; tinners and tinware makers 907; plumbers, gas and steam fitters 851; musicians and teachers of music 788; barbers and hair-dressers 783; laborers (not agricultural) 748; bookkeepers, clerks, etc., 699; engineers and surveyors 695; compositors, printers and pressmen 666; telegraph and telephone operators 641; leather workers 634; hucksters and peddlers 620; butchers 609; marble and stone cutters 588; gardeners, florists, nurserymen 550; carpenters and joiners 511; painters, glaziers, varnishers 499; commercial travelers 474; nurses and midwives 453; teachers in schools 429; farmers, planters and farm laborers 421; tailors 419; blacksmiths 406; iron and steel workers 402; coopers 390; millers (flour and grist) 338; stenographers, etc., 384; dressmakers and seamstresses 347; bakers and confectioners 321; miners and quarrymen 308; steam railroad employees 304; janitors and sextons 297; hotel and boarding house keepers 286; merchants and dealers 279; clergymen 259; milliners 245; masons (brick

*The statistics given are all expressed in terms of 100,000.

and stone) 243; policemen, etc., 236; lawyers 179; lumbermen and raftsmen 179; engineers and firemen (not locomotive) 176; collectors, agents, etc., 169; draymen, hackmen, teamsters, etc., 168; physicians and surgeons 160; brewers, distillers and rectifiers 129; servants 91; boot and shoe makers 74, and boatmen and canalmen 66.

The death rate for iron and steel workers of 402 per 100,000 is only slightly in excess of the rate for the state as a whole, which is contrary to what might be expected when the nature of the occupation is considered. The rate, however, is based on a population for that industry of 7944 as determined by the Federal Census report of 1900, and I believe it shows more persons engaged in that industry than there were at the time the census was taken, or during the period covered by this investigation.

Another element of error which must be considered is the unsatisfactory statement of the occupation of the deceased, which was often given merely as "laborer" or "factory employee," without stating the nature of the industry where employed. This obstacle in the way of satisfactory occupational statistics will be eliminated in the new form of standard death certificate, if the registration officials in the various states insist upon a complete "occupational history" in all cases.

The very low rate of 74 per 100,000 for boot and shoe makers is due largely to the elimination of handwork and the substitution of machinery. The rate per 100,000 for draymen, hackmen, and teamsters of 168 is subnormal, and is due, I believe, to inaccuracies in the statement of the occupation on the death certificate.

A table showing the percentage of deaths from tuberculosis during the age period from 20 to 29 to the total deaths from that disease for each industry, shows the following interesting facts: For telegraph and telephone operators 100 per cent. of the deaths occurred during the age period from 20 to 29; for boatmen and canalmen 100 per cent; among milliners 85 per cent.; for engineers and surveyors 80 per cent; for architects, artists, etc., 66 per cent.; boot and shoe makers 66 per cent.; sailors, pilots, fishermen and oystermen 61 per cent.; teachers in schools 55 per cent.; nurses and midwives 54 per cent.; bookkeepers, clerks, etc., 53 per cent.; stenographers, etc., 50 per cent.; policemen, etc., 50 per cent.; bakers and confectioners 50 per cent.; plumbers, gas and steam fitters 50 per cent.; servants 48 per cent.; other manufacturing and mechanical industries 44 per cent.; leather makers 44 per cent.; apothecaries, pharmacists, etc., 41 per cent.; clock and watch repairers, jewelers 40 per cent.; compositors, printers and pressmen 40 per cent.; mill and factory operatives (textiles) 40 per cent.; other professional industries 30 per cent.; machinists 39 per cent.; dressmakers and seamstresses, etc., 38 per cent.;

cigar-makers and tobacco workers 38 per cent.; musicians and teachers of music 37 per cent.; brewers, distillers, and rectifiers 33 per cent.; barbers and hair dressers 33 per cent.; journalists 33 per cent.; housewives 32 per cent.; iron and steel workers 31 per cent.; tailors 30 per cent.; clergymen 29 per cent.; laborers (not agricultural) 29 per cent.; hotel and boarding house keepers 28 per cent.; blacksmiths 28 per cent.; collectors, agents, etc., 27 per cent.; no occupation 26 per cent.; cabinet makers and upholsterers 26 per cent.; public entertainment 25 per cent.; students 24 per cent.; draymen, hackmen, and teamsters 23 per cent; farmers, planters and farm laborers 23 per cent.; merchants and dealers 21 per cent.; butchers 21 per cent.; painters, glaziers and varnishers 21 per cent.; tinners and tinware makers 21 per cent.; carpenters and joiners 21 per cent.; glass blowers and glass workers 20 per cent.; other mercantile and trading industries 17 per cent.; gardeners, florists, nurserymen and vine growers 16 per cent.; stock raisers, herders and drovers 16 per cent.; other agriculture, transportation and other outdoor industries 16 per cent.; marble and stone cutters 16 per cent.; millers (flour and grist) 16 per cent.; masons (brick and stone) 15 per cent.; commercial travelers 15 per cent.; hucksters and peddlers 14 per cent.; personal service 11 per cent.; saloon-keepers, etc., 10 per cent.; engineers and firemen (not locomotive) 10 per cent.; and miners and quarrymen 10 per cent.

After carefully analyzing the tables which I have prepared to obtain the facts for this discussion, I am inclined to believe that the influence of dust in industry and also the effect of out-of-door, as compared with indoor occupations, have been emphasized at the expense of other factors which should receive careful consideration. Practically all occupations which necessitate hard labor which lowers the resisting power of the body have a high rate from tuberculosis.

In conclusion, I am forced to state that the complex problem defining the relationship of occupation to tuberculosis cannot be satisfactorily solved for the reasons mentioned, and the most that I can hope to accomplish is to point out by means of a concrete demonstration the necessity for uniformity and accuracy in the collection of occupational statistics

Section of Municipal Health Officers

GARBAGE RECEPTACLES.*

By P. M. HALL, M. D.
Commissioner of Health, Minneapolis, Minn.

Garbage collection and garbage disposal have been discussed in a general way so many times that it would seem that the last word had been said. Instead of handling this great subject in a general way now, probably more can be learned by taking up some phase of the subject in greater detail. I shall, therefore, confine this paper to the discussion of the "garbage receptacle" alone.

As a text for this discussion, let us quote the description of the "garbage receptacle" as found in a well-known book on sanitation: "The garbage receptacle, especially when separation of true garbage is made, is usually one of the commonest forms of nuisance to be found. Every garbage can, unless it is emptied daily and thoroughly washed after emptying (which is practically never done), is sure to be offensive in hot weather. The annoyance from it can probably never be entirely done away with, and it is only with great care and at some expense that it can be reduced to a minimum."

When we consider that practically all municipalities collect and dispose of garbage separately from other forms of refuse, we have exactly the condition as defined—a separation of true garbage. As a basis for this paper, letters of inquiry were sent to all cities of 100,000 population and over in the United States and Canada. Replies were received from practically all of them. In the majority of cities it is specified by ordinance or rule that the garbage receptacle shall be water-tight; shall be covered; shall have handles on the side of the can or on the cover; the size is designated from two gallons to two bushels; the materials from which the receptacle is to be made are specified. It is also provided that the receptacle shall be kept in a place remote from dwellings, or placed on walks when the hours of collection are known; that the collector shall neither go up-stairs nor down cellar for it, but that the can must be placed on the ground floor.

* Read before the Section of Municipal Health Officers of the American Public Health Association, Milwaukee, September, 1910.

A very little analysis will show that the sanitary condition of the garbage can has been the principal factor in determining the cost of the collection of garbage. It may be set down as an axiom in the collection of garbage that the cost of collection increases with the frequency of service. The ability of a man and team to collect is not measured by the amount which he collects, but by the number of stops, the distance of travel, and the number of cans he is obliged to handle; so that a daily collection would necessarily cost more than a collection every other day, and a collection twice a week more than a weekly collection. The demand for frequent collection has arisen from, and because of, the sanitary condition of the garbage receptacle. Furthermore, undoubtedly, the sanitary condition of the garbage receptacle has had everything to do with making the mere mention of the word "garbage" an offense. Immediately comes to our minds that same noisome garbage can.

In the rules or ordinances of cities, garbage is almost universally described as the animal and vegetable waste from the kitchen, or as resulting from, or growing out of, the preparation of food. Garbage is subject to rapid decay, a decay which is hastened by three things—heat, moisture and flies; and yet, what we call garbage is but an hour removed from our tables—has been served to us as food.

The first step in the disposal of garbage is to carry it from the house and place it in the can, and the question naturally arises, why should not this step be a sanitary one, and be made in the direction of educating the householder? Under conditions existing in almost every city, the can is as great a nuisance, if not a greater one, than the garbage itself. In primitive days, the Indian, when the offense from the waste products of his housekeeping became too noisome, moved away; but in our day and generation, we remove the garbage and keep the smell. Take the first step, that of placing the garbage, the waste food or droppings from our tables, into any kind of receptacle—wood, galvanized iron, or what-not—and with the presence of heat, moisture, and flies, there will very soon be a foul, maggoty, fly-breeding mess of putrefaction. Such a mess is necessarily a nuisance, requires frequent removal, and is a nuisance every time it is handled from the can to its final disposal. Is it necessary that this condition of things should be? Is there no way to eliminate these aids to putrefaction—heat, moisture, and the fly? Is it not a little bit inconsistent that we legislate and talk about fly-infection, when we are perpetuating the fly-nuisance in the garbage can by furnishing a most prolific breeding place? It has been said that the annoyance of the can probably never will be done away with. It seems that this condition of things

has been accepted everywhere, and that nobody has tried to solve the problem. We find, however, exceptions in two cities—one in the United States and the other in Canada—where an effort, at least, has been made to keep the garbage can from being a constant nuisance. How these two cities have been trying, with a great measure of success, to make the garbage can no longer a nuisance, is the subject of this paper.

"Drain garbage of all moisture, then wrap it in paper before putting it in the can, and it will neither smell bad in hot weather, nor freeze and stick to the can in cold weather. Do this and have a clean can at all times."

Heat, moisture and the fly are all eliminated by the foregoing method. This rule was put into practice in Minneapolis in February, 1907, and is still in force. The campaign of education was a hard one, but we have won. As one of the garbage collectors recently said to me: "The garbage cans in my district are clean enough to keep pies in." A recent clipping from one of the Minneapolis papers bears most pertinently on this point:

"BRIGHTENING THE LIFE OF THE GARBAGE MAN."

"While speaking along this line of housework, did you ever notice that the conscientious housekeeper is known by her garbage can? The gentleman who collects the garbage does not do it for pleasure, nor for his health, nor to help the community to live a sweeter, saner life. Harsh necessity rules his business, as it does yours.

"Now the garbage collecting business differs from the florist business in divers ways. But it can be made much more simple and enjoyable by the housekeeper who will take a little thought for others. No garbage collector ever makes the rounds without here and there coming upon a collection which causes tears to course their grimy way down his weather-beaten cheek. This is because there lives at that place where he does his weeping a careful and thoughtful housewife. Every time she takes any garbage out, she wraps it carefully in old newspaper or wrapping paper and ties it in a neat bundle. The result of this simple act is that the garbage collector raises his hand to heaven and blesses the place, and life for all concerned is sweeter and richer for this simple act of thoughtfulness."

It all rests with the collector. He has but to report to the department that the garbage is not properly drained and wrapped in paper, and no further service is rendered until the rule is complied with. If the householder fails to care for his garbage properly, or to have it cleaned up, he is brought into court and fined.

The operation of this rule has its economic, as well as its sanitary side. The life of the can is very much prolonged. The garbage will roll out of the can in cold weather as well as in the summer; if it does not, and the garbage is frozen, the can is not emptied, for the householder has failed to drain off the moisture. The collector is forbidden to carry or use a

pick or crowbar to dig our frozen garbage, so the can is not battered up. Garbage kept in this way is not a nuisance, does not invite flies, and needs to be collected but once a week, even in warm weather, all of which makes a great saving in the cost of collection. It follows naturally that garbage which is not foul in the can will not be so in the wagon or cart. The garbage can should be kept water-tight; when it is not so, it should be discarded and a new one provided. A great deal of trouble has arisen from the tipping over of the cans by dogs. A recent invention in the shape of a small appliance on the cover makes the cover self-locking, and the dog nuisance a thing of the past.

The size of the can depends so much on the frequency of collection that it need hardly be discussed here. We have found that a 20-gallon can will take care of the garbage of an average sized family for a week, and is easily handled by the collector. It is not necessary, even in a cold climate, to have different receptacles in the winter time, for if the rule regarding drainage of moisture and wrapping with paper is followed, a metal can is just as easily emptied and kept clean in the winter months as a wooden one.

The question of location of the can is determined largely by the method of collection. In general terms, it may be said that cans should be placed where they are most accessible to the driver.

The results of over three years' experience with this method of handling garbage in our city have been entirely satisfactory. At first the plan was laughed at as a fad of the department. We were asked when we would also require that the packages be tied with baby ribbon; but we persisted, and now the public is in accord with us, for they have seen actual results in the shape of clean, sanitary cans which are no longer a nuisance. Is it not a pertinent question that in the collection and disposal of garbage the first step should be a system of collection that gives to the citizen a garbage can which is no longer a nuisance?

Notes and Reviews*

EPIDEMIOLOGY AND PREVENTIVE THERAPEUTICS.

C. V. CHAPIN, M. D.
Providence, R. I.
(*Reviewer.*)

A Health Officer's Study of Tuberculosis. The reports of Matthew Hay, the Medical Officer of Health of Aberdeen, always contain interesting original material. That for 1909 is no exception. It contains a detailed study of tuberculosis. Hay calls attention to the fact which has been noted elsewhere that the decline in this disease began long before its infectious nature had been demonstrated by Koch; and he shows what also has been noted elsewhere, that the rate of decline was almost as great before any administrative attention was being paid to it as it has been after such attention began. He attributes the decline chiefly to improvement in general hygienic conditions. He refers to Newsholme's views that the increasing segregation of consumptives in institutions is an important factor in the decline, but he does not think that the figures in Aberdeen, so far as obtainable, support this view. The experience of Providence, as indeed that of other American cities, corresponds to that of Aberdeen, but Newsholme thinks that the rapid changes of population in American cities render their experience on this point of little value. Of 300 deceased cases in Aberdeen, investigated as to whether the patient had been informed of the nature of the disease before death, it was found that in about 50 per cent the attending physician had not told the patient of the diagnosis and, of course, could not have given definite instructions as to the restriction of infection. Perhaps this neglect on the part of the medical attendant, which, it is to be feared, is as common in many American cities as it is in Aberdeen, may be one reason why the "administrative control of tuberculosis" has been productive of so little results.

Although the figures are not large, a study of infantile tuberculosis does not indicate any close connection with the consumption of cow's milk, but it does indicate a close relationship with tuberculosis in the family.

*Editor's Note. Readers are urged to send public health notes of interest to the Editor by whom they will be distributed to the proper reviewer. The sender's name or initials should appear under such notes.

Dr. Hay gives charts for tuberculosis, whooping cough, and measles, showing the distribution of deaths among children under 3 months, 6 months, 12 months, and for each year up to the fifth year. The similarity between these charts is suggested as an indication that the excessive mortality from these diseases in very early life is due, not to exceptional exposure to infection, but to an inherent inability to withstand the disease, owing to the physical characteristics of that period of life.

There are apparently no "lung blocks" in Aberdeen, for the health officer has failed to meet with "any well marked example of the so-called tuberculous house, or the house that seems to remain infected after some earlier case of phthisis, and to continue to infect a series or a succession of tenants. There have been a few cases—amounting to 4 or 5 per cent. of the cases of phthisis investigated—in which there was a suspicion or even a certainty that a member of the immediately preceding tenant's family had suffered from tuberculosis; but the disease is so wide spread that one must allow for a considerable percentage of accidental coincidences." It is also shown that, as has been the experience in other cities, the removals of tuberculous families from house to house are quite frequent, and in Aberdeen in about three-fifths of these removals no attempt is made by the occupants to disinfect the house before removal, and although disinfection is practiced by the health department after the death of a patient, it is rarely done after removal. Yet these alleged infected houses apparently fail to infect.

Dr. Hay adds his quota to our knowledge concerning marital tuberculosis. He finds that in 7 out of 121 husbands dead of tuberculosis, their death had been preceded by the death or illness of their wives from phthisis, and of 88 wives that died of tuberculosis in only 2 instances was the death preceded by the death of a phthisical husband. Allowing for the ages of the parties, and the duration of married life, the number of husbands infected from their wives was two or three times more than the number derived from a calculation of the probabilities, and the number of wives infected from their husbands was about equal to the probabilities. In 6 of the 9 cases of possible marital infection there was a tuberculosis history in the family of the person infected.

Management of Ringworm. The report of the Chief Medical Officer of the Board of Education (George Newman, M. D.) contains much information concerning methods of school inspection in England, and is worth perusal by all Americans interested in that subject. The question of controlling ringworm is dealt with at some length, and the action of various health authorities is referred to. Many of these consider that ringworm is only slightly contagious, and that it tends to die out even when left to

itself. Priestly found ringworm in 71 out of 370 schools in Staffordshire. That it did not tend to spread is shown by the distribution of the cases in the schools, which was as follows: 1 had 5 cases of ringworm; 2 had 4 cases each; 4 had 3 cases each; 11 had 2 cases each; 53 had 1 case each.

On the other hand, Dr. Moffatt,* assistant school medical officer for Bolton, mentions that 84 cases of ringworm were met with last year, and of these 40 occurred in a sharp outbreak at one school.

An investigation during the following year showed that for every school where ringworm managed to persist into the second year there were two or three where it died out. Priestly, as well as others, thinks that children with ringworm may be permitted to attend school under the following conditions:

1. The hair to be cut short.
2. The case to be under daily treatment.
3. The child to wear a linen skull cap. The cap should belong to the school, and must be exchanged for a clean one when the child arrives in the morning, but the child must go home in it and return in it the next day. It must be worn continuously in and out of doors, as far as the teacher can control this. The discarded cap must be boiled.

The English find that the drug treatment is not usually very successful, especially when applied by the family physician, and it has been shown that a very high percentage of those reported cured by their physician are still infected. The X-ray treatment is steadily superceding other forms, and has been extensively employed by the education authorities in London, Croydon, Finchley, Salford, Bradford, and other places. Excellent results are reported.

* The Medical Officer, 1910-1911, V. 288.

PUBLIC HEALTH NEWS AND NOTES.

B. L. ARMS, M. D.,
Director of the Board of Health Laboratory, Boston, Mass.
(Reviewer.)

The New York Milk Committee, a voluntary organization working in the interests of improving the milk supply of New York City, at a Convention held under their auspices on December 2 and 3, 1910, as a result of resolutions passed by the numerous experts who attended that convention, decided to appoint a Commission on Milk Standards. It was thought desirable that such a Commission should be representative, and yet not large. The chief reason for its appointment was the lack of uniformity existing throughout the country, particularly with reference to the standards for the bacteriological character of milk. The Committee considered a large number of names, especially those who were familiar with the examination of milk for bacteria, and from the list asked the following gentlemen to serve as members of the Commission.

Dr. W. A. Evans, Chicago, Ill.	Prof. H. C. Sherman, Columbia Univ.
Dr. Wm. H. Park, New York City.	Dr. A. H. Stewart, Philadelphia, Pa.
Professor M. J. Rosenau, Harvard Univ.	Dr. W. R. Stokes, Baltimore, Md.
Professor H. W. Conn, Middletown, Conn.	Dr. B. L. Arms, Boston, Mass.
Dr. John A. Anderson, Washington, D. C.	Mr. Chester H. Wells, Montclair, N. J.
Dr. A. D. Melvin, Washington, D. C.	Dr. M. P. Ravenel, Madison, Wis.
Dr. E. C. Levy, Richmond, Va.	Dr. G. W. Goler, Rochester, N. Y.
Professor W. A. Stocking, Cornell Univ.	Mr. Raymond A. Pearson, Albany, N. Y.
Dr. L. L. VanSlyck, Geneva, N. Y.	Dr. Chas. E. North, New York City.

This Commission held its first meeting on May 22nd, 1911, at the Academy of Medicine, New York City, which was kindly placed at their disposal. Dr. Evans was elected Chairman, and Dr. North, Secretary. All expenses of the Commission are paid by the New York Milk Commission.

The Commission informally resolved at the outset that its work would necessarily cover several months at least of time, and that therefore, it would be unwise to reach any final conclusions at its first session. In order to obtain some idea of the feeling of the members upon the several subjects which had been prepared for discussion, certain resolutions were brought up and passed, with the understanding, however, that such action was not final, and that these resolutions might be revoked at future meetings of the Commission.

The matters passed upon in this way were the following:

1. That the interests of public health demand that the control of milk supplies shall include regular laboratory examinations of milk by bacteriological methods.

2. That among present available routine laboratory methods for determining the sanitary quality of milk, the bacterial count occupies first place.

3. That bacteriological standards should be a factor in classifying or grading milks of different degrees of excellence.

4. That bacteriological examinations of milk are of importance at every stage of production and distribution, but in the establishment of grades and classes of raw milk, such grades and classes should be based on the bacterial content of milk as offered for sale.

5. That small cities and villages should have the same classifications for milk as large cities.

6. That there should be bacteriological standards for the control of milk distribution for the milk before it is pasteurized, and for the milk after it is pasteurized.

7. That chemical standards for milk delivered to cities and towns should be not less than 3¼% butter fat, and 8¼% solids other than fat.

8. That milk should be divided into several classes, as follows:

Class A—Certified milk, or milk which is produced in conformity with the requirements of certified milk.

Class B—Inspected milk, or milk produced under careful conditions so far as cleanliness or infectious diseases is concerned; to contain while raw not over 60,000 bacteria per cubic centimeter on the average; to come from farms scoring not under 60% on the Government score card; to be obtained from cows which are given a physical examination and tested with tuberculin at least twice a year; to be placed only in sterilized containers, and in general to be fresh and clean; pasteurization of this milk from tuberculin tested cattle is optional, otherwise compulsory.

Class C.—Market Milk. Market milk comprises all whole milk legally permitted for sale, not in Classes A, B or D. Pasteurization of this milk is compulsory.

Class D.—Milk for cooking purposes. Milk containing over one million bacteria per cubic centimeter, or from farms scoring less than 40% on the Government score card, or older than three days, shall be pasteurized and labeled "for cooking purposes only."

Class E.—Pasteurized milk. Pasteurized milk is milk heated to not less than 60° C. or 140° F. for not less than 20 minutes or its equivalent; nor higher than 70° C. or 158° F. for not less than five minutes, and rapidly chilled. It must be placed in sterilized containers, and handled so as to prevent reinfection. Pasteurized milk shall be labeled with the date on which heating was done.

Class F.—Heated Milk. If heated to a higher degree, the milk should be labeled "heated milk," the temperature and the date of heating being shown on the label. Pasteurized and heated milk shall be under official surveillance.

Class G.—Skim Milk. Skim Milk shall contain not less than 8½% solids not fat, and not more than 1% fat, to be labeled "Skim Milk."

9. That the bacterial count of milk indicates its quality and history either as modified by initial contamination, improper handling, dirt, or improper refrigeration. A high count indicates the necessity of investigation and inspection in order that remedies may be applied.

10. That there be adopted as standards for making the bacterial count, the "Standard Methods for the Bacterial Examination of Milk," of the American Public Health Association, Laboratory Section; recommending, however, the incubation of plate cultures at 37° C. for 48 hours.

11. That the examination of milk for the bacteria of tuberculosis, either by microscopic examination, or by the inoculation of animals, cannot be considered definite. That, therefore, milk containing the tubercle bacillus be excluded from the market by means of the tuberculin testing of cattle or by the proper pasteurization of milk.

Several other subjects were discussed and referred to special committees.

The following committees were appointed:

Executive Committee—Dr. Evans, Dr. Rosenau, Mr. Pearson, Mr. Wells, Dr. North.

Committee on Grades and Classes of Milk—Dr. Melvin, Dr. Park, Dr. Anderson.

Committee on Bacteriological Standards.—Dr. Rosenau, Dr. Park, Professor Conn.

Committee on Chemical Standards.—Dr. Van Slyck, Dr. Sherman, Mr. Pearson.

Committee on Standard Ordinances and Laws Controlling Milk.—Dr. Arms, Mr. Wells, Dr. Stewart.

COMMITTEE TO CONSIDER LICENSING OF DEALERS IN BABY MILK—Dr. Evans, Dr. Levy, Dr. Stokes.

COMMITTEE ON NEW QUESTIONS—Dr. North, Dr. Ravenel, Dr. Goler.

It was decided that the special committees appointed should carry on their work during the coming summer, and that the Commission should hold another meeting some time during the month of October.

It was thought possible that the Commission could bring its deliberations to a conclusion at the October meeting.

The Committee on New Questions was instructed to correspond with all the health officers of this country, with a view to ascertaining just what particular questions connected with the control of milk supplies seemed to them the most important, and to use this information as the basis for suggestions to be made at the next meeting.

The Secretary, Dr. Charles E. North, 30 Church Street, New York City, would greatly appreciate it if health officers and others interested would send in comments or suggestions concerning milk standards and the control of milk supplies for the consideration of this Commission at its next meeting.

The Healthologist.—The Official Bulletin of the Health Department of Milwaukee appears this month (June) under a new title, "The Healthologist." It is filled with timely material presented in a convincing manner.

"Anti-Vaccination Hospital,"—a New Name for a Pest House.*—"Few places have more repulsion for people than the so-called 'pest house.' Entire communities rebel against having such institutions in their midst. Vandals go so far as to burn them, as it is believed they did in Key West, and attempted to do in Tampa.

"Now it may be that there is something in a name. Perhaps 'Anti-vaccination Hospital' would be less repulsive, especially to those in whose honor the name is proposed. And since it is the anti-vaccinationists that make up the clientele of these smallpox institutions, the name 'Anti-vaccination Hospital' would certainly be appropriate.

"And who knows but that in time, under the protecting wing of the 'antis,' and with their liberal patronage, and wearing a new and dignified name, the old-time pest house might at length become a respectable institution that communities would fight for, even as they do for penitentiaries. And it would have the advantage that any community could have one as soon as it had 'antis' enough to support it."

* Florida Health Notes, June, 1911.

Changes in Personnel in Florida State Board of Health.*—"On April 17, 1911, Dr. Jos. Halton, of Sarasota, was appointed agent of the State Board of Health for Manatee County, vice Dr. H. Baer, of Bradentown, who had removed from that county.

"On May 5, Dr. F. F. Ferris, of Apalachicola, was appointed agent of the State Board of Health for Franklin County. This addition to the Board's representation in Franklin County was necessitated by the prevalence of smallpox at Apalachicola, and because the duties of Dr. B. B. Blount, who has been our agent for many years but lives at Carrabella, prevented him from giving the attention to sanitary affairs at Apalachicola that the present exigency demanded. Dr. Ferris has established regular office hours for vaccination, at which time the citizens are presenting themselves to receive this protection, free of charge.

"On May 17th, Dr. W. Kilmer, of Orlando, resigned as the Orange County Agent for the Board, and on the same day, Dr. T. M. Edwards, of Green Cove Springs, who is removing from the state, resigned his position as agent for Clay County. New appointments for these two counties will probably be announced in the July issue of the Notes."

An Act to Prohibit the Use of Suction Shuttles in Factories in Massachusetts.†

"SECTION 1. It shall be unlawful for any proprietor of a factory or any officer or agent or other person to require or permit the use of suction shuttles, or any form of shuttles, in the use of which any part of the shuttle or any thread is put in the mouth or touched by the lips of the operator. It shall be the duty of the State Board of Health to enforce the provisions of this act.

SEC. 2. Violations of this act shall be punished by a fine of not less than fifty dollars for each offense.

SEC. 3. This act shall take effect on the first Monday of May in the year nineteen hundred and twelve; but if the proprietor or manager of a factory shall, in good faith, show to the State Board of Health sufficient reasons for its inability to comply with the provisions hereof at the time when this act is to take effect, the said board may, in its discretion, grant a reasonable extension of time within which the said factory shall comply with the provisions hereof. (Approved April 13, 1911.)"

The Sanitary Control of Venereal Diseases.‡—"One of the significant features of the present world-wide movement for the conservation of health and vitality is the slow yet steady change which is taking place in the attitude of thinking men and women toward the venereal diseases. It may be truly said that we are standing upon the threshold of a new era in the status of these maladies. Very few years ago no magazine intended

* Florida Health Notes, June, 1911.
† Monthly Bulletin, Massachusetts State Board of Health, April, 1911, Chapter 281, Acts of 1911.
‡ The Monthly Bulletin of the Department of Health of the City of New York.

for lay readers, and certainly no newspaper, would go so far as to print the words gonorrhea or syphilis, and articles dealing with these infections were rigidly excluded. Today, venereal diseases and their consequences are openly and fearlessly discussed, not only in certain magazines of the progressive type, but in clubrooms and from the lecture platform, by men and women who are imbued with the need of a wide extension, for the benefit of humanity at large, of the knowledge of these diseases. In a number of cities in this country, special societies composed of physicians and laymen have taken up propaganda for the education of the people, especially the younger generation, in the nature and dangers of venereal diseases, and recently these societies have become federated into a general body, giving the movement a national character.

"There has been for some time, among students of the social diseases, a growing conviction that these affections should be dealt with very much in the same manner as other preventable maladies, such as tuberculosis, for example. The contention that the venereal diseases are shameful and secret, and therefore should not be regarded in the same class as other communicable diseases, is sufficiently answered by the well recognized fact that these maladies are very frequently innocently acquired, and that the most pathetic consequence of their prevalence is the suffering and death of many wives and children who are helpless victims of marital and parental transmission. In the words of Bouchard 'the shame of these diseases is only for society which does not know how to deliver itself from their plague; which allows itself to be decimated by them'."

Smallpox and Vaccination in the Philippine Islands.*—During December, 1910, a person afflicted with smallpox was transferred from San Jose, Antique, to the Island of Caluya, which is a small isolated island south of Mindora, the inhabitants of which have heretofore not been systematically vaccinated. An old woman took some of the contents of a pustule from the smallpox case shortly before death, and commenced to vaccinate a number of the inhabitants. Smallpox in epidemic form soon resulted. The population of Caluya and near-by islands is about 2,000. Approximately 1,000 cases of smallpox occurred before the facts became known to the outer world. Vaccinators, properly equipped, were immediately sent to Caluya. They vaccinated 800 of the remaining thousand persons. Of these not one contracted smallpox who had a successful vaccination that was two weeks old. The chief quarantine officer visited ten families, ranging from 5 to 8 in number. In 6 of these every member was stricken with smallpox. A physical examination showed that they had no vacci-

* Victor C. Heiser, U. S. P. H. & M. H. S. Reports, June 9 and 11, 1911.

nation marks. In two other families 6 persons were stricken and 2 escaped infection. A physical examination showed that of the 6 stricken members not one had been vaccinated. The 2 remaining members had successful vaccination marks. Upon inquiry, it was learned that they had visited Calapan a year previously and were vaccinated while there. In two other families living in the midst of a smallpox stricken village there were no cases of smallpox. A physical examination showed that they had good vaccination scars. Further inquiry elicited a statement that they had but recently come from another island where they had been vaccinated. In one house one person was found with varioloid. Upon inquiry, it was learned that he had not been vaccinated during childhood.

"Net Result: Community of 2,000 population; 1,000 unvaccinated persons contract smallpox, 400 die; 800 are protected by vaccination, no cases occur after the incubation period was passed, and no deaths occurred. The remaining 200 are semi-civilized and fled from the vaccinators, and their condition is unknown."

Measles Successfully Transferred to Monkey.* Drs. Anderson and Goldberger report successful results from inoculating blood from patients suffering from measles into rhesus monkeys, in one instance carrying the infection through three monkeys, producing a reaction-elevated temperature and an eruption.

License to Practice Medicine May Be Revoked If a Physician Fails to Promptly Report Births and Deaths.† "Attorney-General Carmody, in an opinion rendered to the State Commissioner of Health, forcibly defines the powers and duties of local Boards of Health and the State Department of Health in enforcing the provisions of Section 22 of the Public Health Laws requiring prompt and complete reports of all births to be filed with the Department each month.

"Mr. Carmody says in part:

" 'The method of registration of births by the local boards of health is prescribed by the State Department of Health and should be followed by such local boards. I fail to conceive that the prosecution of a physician for a violation of law is more serious than that of a person of any other profession or occupation. Because of the many privileges accorded him by law, and his prominent place in society, a duly licensed and registered physician should be one of the first in the community to realize the public benefits secured by compliance with the Public Health Law, and he should be one of the first to assist in its enforcement. The authorities in any municipality should not, through fear, hesitate to enforce the law. Where the authorities of municipalities neglect or refuse to perform the duties of their office they may be removed.

* Public Health Reports, June 9 and June 16, 1911.
† Monthly Bulletin New York State Department of Health, May, 1911.

The State of New York will not tolerate its system of vital statistics to be impaired by the failure of the authorities of a municipality to perform the duties they have sworn to perform.

" 'After a careful consideration of the matter requested, I arrive at the conclusion that where a local board of health neglects or refuses to make and enforce the ordinances as provided by the Public Health Law, the State Department of Health may mandamus such board under the authority given by section 37 of the Public Health Law; or, after notice to the local board of health is given of registration defects, the State Department may, under the provisions of section 5 of the Public Health Law, take control in any municipality of the registration and record thereof, enforcing the rules and regulations in regard thereto, securing complete registration, and continue such control until the Commissioner of Health is satisfied that the local board of health will make the proper registry and record required by law, and that the expenses of such control shall be a charge upon the municipality. Also, that persons violating lawful local health ordinances may be prosecuted under such ordinances and under the provisions of Section 1740 of the Penal Code, and where a physician is found guilty of violating the Public Health Law, or section 1740 of the Penal Code, he may be proceeded against under the provisions contained in section 170 of the Public Health Law for the annulment of his registration and the revocation of his license to practice medicine in this State' "

"The Commissioner of Health of New York regards the decision of the Attorney General as a very important and able document. The responsibilities resting upon local boards of health are clearly outlined, and it is the intention of the department to see, so far as it lies in its power, that their duties are carried out. It is extremely important that the registration of vital statistics should be improved, particularly in those places which have been negligent in the past, and the Commissioner will take active steps to that end where the local boards of health fail to do so."

Personals. Dr. Hibbert Winslow Hill, Director of the Division of Epidemiology of the Minnesota State Board of Health, received the Diploma of Public Health (by examination) of the University of Toronto at the recent commencement, Friday, June 9th, 1911. Dr. Hill graduated from Toronto University in 1893, with honors and a post graduate scholarship, receiving the degree of M. B., which is the only degree granted by Toronto University on graduation in medicine. In 1899 he received the M. D. degree, together with the Starr gold medal, awarded for a thesis on "Relation of Bacteriology to Public Health." The Diploma of Public Health, just granted, is the first given by the University of Toronto, although the course has been open and the degree available for several years.

BOOK REVIEWS.

Education and Preventive Medicine. Norman Edward Ditman, Ph. D., M. D. The Columbia University Press, N. Y. Paper, 25 cents.

This is an extremely interesting paper of seventy-three pages, which covers the field of preventable diseases briefly, but forcefully, showing by both text and charts (24) the great need of training health officers in all branches of sanitation, and also of educating the public to understand that they, also, have an important part to play.

Comparisons are made between the far reaching epidemics of the earlier centuries and the present day as in the case of smallpox.

The great gain in human life, due to the knowledge of the mode of transmission of yellow fever, is shown, closing with the quotation from General Leonard Wood's tribute at the memorial service to Major Read: "I know of no man who has done so much for humanity as Major Reed. His discovery results in the saving of more lives annually than were lost in the Cuban War and saves the commercial interests of the world a greater financial loss each year than the cost of the entire Cuban War."

Plague, cholera, syphilis, gonorrhea, tuberculosis, diphtheria, beri beri, rabies, pneumonia, and typhoid are discussed. Alcoholism and its relation to health and society has nearly four pages devoted to it. Cancer, heart disease, diabetes and Bright's disease are taken up with a plea for research into causation and diminution. Infant mortality and preventable accidents also receive attention.

This excellent paper should have a very wide circulation as its power for good is great. B. L. A.

CLIPPINGS.

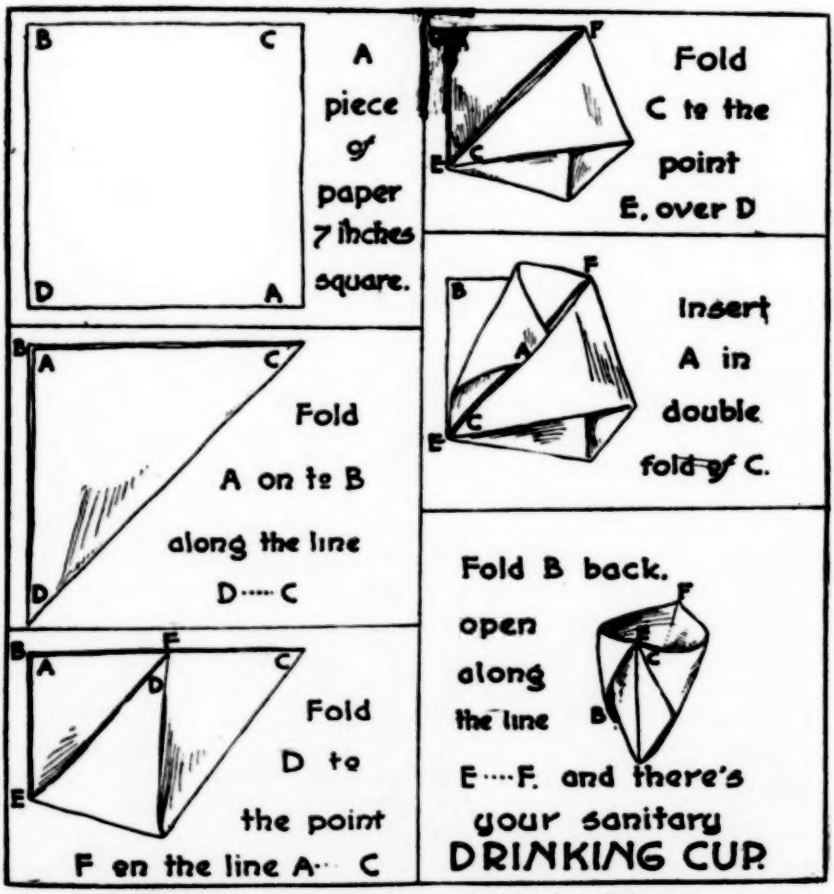
Cheap Bubble Fountains. Those interested in abolishing the common drinking-cup have often encountered the difficulty of expense in the installation of the drinking fountain with the bubble cup. Two eastern cities offer inexpensive solutions of that difficulty. In one, in which the common drinking-cup was forced out by state laws, an immediate compliance was necessary, and the simple expedient was resorted to of merely removing the cups in all public places and turning the faucets upside down. In this position, when turned on, the tip of the faucet formed a "bubble-cup" and was found satisfactory enough to be continued permanently as a drinking fountain.

The other method consists of a straight metal arm about eight inches long connected with an ordinary faucet, the arm being a plain piece of piping with a cup-shaped tip for drinking purposes. A more elaborate form of this arm-extension to an ordinary faucet provides a double pipe, one enclosed in the other, the smaller pipe taking the water to the cup at the tip, from which the waste water is carried back in the larger pipe to the waste pipe. There is thus no over-flowing at the cup-tip of the arm as there is in the other methods.—(The Survey, July 22, 1911.)

The University of Michigan has conferred the honorary degree of Doctor of Public Health on Dr. W. A. Evans of Chicago, and Dr. Guy L. Kiefer, Health Officer, of Detroit.—(Journal A. M. A.)

Health Officers' Association. At Charlotte, June 19, the North Carolina Health Officers' Association was formally launched, with the following as officers: President, Dr. Lewis B. McBrayer, Asheville; vice-president, Dr. Lucius H. Glenn, Gastonia; secretary-treasurer, Dr. Watson S. Rankin, Raleigh. The constitution and by-laws adopted limit membership to members of state, county or municipal boards of health or employees of the same.—(Journal A. M. A.)

HOW TO MAKE A PAPER DRINKING CUP.


B
C
D
A
A piece of paper 7 inches square.
Fold A on to B along the line D····C
Fold D to the point F on the line A···C
Fold C to the point E, over D
Insert A in double fold of C.
Fold B back, open along the line E····F. and there's your sanitary DRINKING CUP.

(Devised by Dr. H. St. Clair—Health Dept., Chicago.)

WILLIAM BAILEY